

1884.

BOROUGH OF CARDIFF.

REPORT

ON THE

Sanitary Condition of Cardiff,

FOR THE YEAR 1883,

BY

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TO THE
CARDIFF URBAN SANITARY AUTHORITY.

Cardiff, February 25th, 1884.

GENTLEMEN,

I have now to submit my Annual Report for the past year, and shall, as heretofore, direct your attention to such influences as I have reason to believe operated in a greater or less degree on the public health. These are the Meteorological (and in these I include Climatological),—the water supply,—the food supply,—the drainage, and the dwellings of the working classes.

THE METEOROLOGY.

To estimate correctly the relative sanitary condition of a locality, it is necessary to take into consideration the extent to which Meteorology contributes to the sickness or mortality; whether its influences are exerted directly or indirectly, and as nearly as possible to ascertain the precise way in which these operate. When direct, they are mostly temporary in duration, and excite special kinds of sickness. Although the direct influences do not admit of any control to be exercised by a Sanitary Authority, they are interesting from a sanitary standpoint, as they cause a high death rate as long as these influences prevail. This was especially observed during the three autumnal months, October, November, and December. At this time the weather was severe, being cold and damp, with strong winds

prevailing (N.E. and N. preponderating). The humidity of atmosphere, as shown by the Hygrometric readings (approaching at times to complete saturation) caused an excess of mortality from acute inflammatory affections, especially of the respiratory organs; the mortality from zymotic diseases being less than at any other periods of the year.

The indirect influences of Meteorology and Climatology differ from the direct, in that they are more numerous, conjoined with others that increase their intensity, and they are especially amenable to sanitary provisions. Within my recollection the sparse population scattered over the low lying marshes in our neighbourhood suffered greatly from intermittent fever, due to the malaria generated by the large quantity of water retained on the surface by reason of the clay subsoil. When the agriculturist was taught that, by removing this water by a system of drainage, he would render his pastures more fertile, he, in carrying out these instructions, also unconsciously effected a great sanitary operation, ague being here now unknown.

After the visitation of Asiatic Cholera in 1848, considerable attention was directed to the insanitary state of several towns that had suffered severely from the epidemic, and active remedial measures were taken to remove all predisposing and exciting causes of epidemic disease. In 1862 Dr. George Buchanan, the present Medical Officer of the Privy Council, whose active energies have ever been devoted to Hygiene, whose writings and opinions have been expressed in terms so clear and terse as to commend them to the attention of all interested in that science, delivered a course of lectures on Public Health at University College, London. In these lectures he illustrated the results of sanitary improvements in certain towns, and by a series of observations extending over a period of six years, he compiled a table in accordance therewith. Amongst these towns Cardiff will be found, and is in reality the most striking case. This table (A) I insert :

TABLE A.—Table shewing the improvement in the Public Health by Sanitary Works.

Compiled by Dr. G. Buchanan, and extracted from his Lecture on Public Health.

NAME OF PLACE.	Population in 1861.	Average mortality per 1000 before construction of works.	Average mortality per 1000 since completion of works.	Saving life per cent.	Reduction of Typhoid Fever rate per cent.	Reduction in rate of Phthisis per cent.
Banbury	10,238	23·4	20·5	12½	48	41
Cardiff	32,954	33·2	22·6	32	40	17
Croydon	30,929	23·7	18·6	22	63	17
Dover	23,108	22·6	20·9	7	36	20
Ely	7,847	23·9	20·5	14	56	47
Leicester	68,056	26·4	25·2	4½	48	32
Macclesfield	27,475	29·8	23·7	20	48	31
Merthyr	52,778	33·2	26·2	18	60	11
Newport	24,756	31·8	21·6	33	36	32
Rugby	7,818	19·1	18·6	2½	10	43
Salisbury	9,030	27·5	21·9	20	75	49
Warwick	10,570	22·7	21·0	7½	52	19

One most remarkable instance will be found in the column relating to Phthisis. This is a constitutional disease, and the results shew that even this class is amenable to sanitary measures. Dr. Buchanan has elsewhere demonstrated that Phthisis prevails more extensively in humid than in dry localities. A large portion of Cardiff has been built on an alluvial clay deposit, and before the public sewers were constructed, much water was always to be found on the surface, causing great humidity of atmosphere. In 1854 the first portion of these sewers had been utilised, and a decrease in mortality from Phthisis immediately commenced, continuing up to the present time.

But the most important result of sanitary improvements is in the diminished mortality from the seven chief zymotic diseases. During the summer quarter, when the temperature is high, it favours the decomposition of all impurities exposed to its influences, and, as a consequence, develops the infective germs of epidemic disease, hence, according to the activity displayed by the executive of a Sanitary Authority in the removal of the exciting causes, these diseases prevail to a greater or less degree.

The Meteorological observations are as under.

THE RAINFALL.

The rainfall during the year 1883, as observed by Mr. W. Adams, C.E., F.G.S., at his residence, Cambridge House, Park Place, Cardiff, is shewn by the subjoined table :—

Latitude, N., 51 deg., 9 min. 10 sec.
 Longitude, W., 3 deg., 9 min. 55 sec.
 Diameter of Receiver of Gauge, 5 inches.
 Height above ground, 1 foot.
 Height above sea-level, 43 feet.

RAINFALL. TABLE No. 1.

The following table shews the monthly rainfall, the greatest fall in 24 hours, with date, and the number of days on which 0·01 in. or more fell :—

Month.	Total Depth.	Greatest fall in 24 hours.	Date.	Days on which 01 inch or more fell.
January	5·75	1·11	24th	25
February	3·73	0·65	10th	20
March	·60	0·12	19th	10
April	·67	0·28	26th	7
May	1·90	0·70	11th	12
June... ..	1·81	1·16	27th	17
July... ..	3·56	0·82	20th	21
August	2·09	0·73	8th	16
September	6·14	1·53	23rd.	19
October	4·23	0·61	15th	17
November	6·38	0·80	21st	24
December	1·92	0·57	10th	17
	38·78			205

TABLE No. 2.

The following is the rainfall for the year 1883, as compared with six previous years :—

Month.	1877	1878	1879	1880	1881	1882	1883
	Inches	Inches	Inches	Inches	Inches	Inches	Inches
January ...	5·77	1·73	4·71	·87	·92	3·19	5·75
February ...	2·79	3·07	5·95	3·88	4·81	2·56	3·73
March ...	2·66	1·25	1·14	1·90	3·88	2·26	·60
April ...	2·90	4·10	2·64	1·98	1·44	5·68	·67
May ...	2·47	4·32	2·85	1·45	2·62	2·72	1·90
June... ..	1·48	3·68	6·48	2·38	3·59	4·28	1·81
July	4·94	2·01	4·00	6·64	2·62	5·77	3·56
August ...	5·70	10·82	8·12	·77	6·94	6·75	2·09
September	3·25	3·21	4·85	3·67	2·09	3·94	6·14
October ...	4·89	5·76	1·51	4·94	3·23	8·33	4·23
November	6·54	3·06	0·43	3·67	4·98	6·26	6·38
December	3·40	2·70	2·11	6·70	4·50	4·86	1·92
	46·79	45·71	44·79	38·85	41·62	56·60	38·78

Average of the six previous years 45·22. The rainfall during 1883 is less than any previous year, and 6·22 in. below the average.

The following is a monthly summary of the Meteorological observations, with corresponding mortality :—

TABLE B.—Illustrates the Meteorology of the Year 1883.

MONTH.	BAROMETER.			THERMOMETER.						HYGROMETERS.		TOTAL RAINFALL.
	Highest.	Lowest.	Mean of Month.	Maximum.	Minimum.	Mean of Max.	Mean of Min.	Mean of Month.	No. of days at or below 32 deg.	Mean of Wet Bulb.	Mean of Dry Bulb.	
January ...	23rd...30.503 in.	13th...29.179 in	29.853 in.	1st, 54.02	16th, 31.06	43.09	37.02	40.05	2	41.07	40.04	5.75
February ...	23rd...30.770 "	2nd...28.759 "	29.991 "	22nd, 54.07	1st, 29.09	49.08	38.06	44.02	1	43.03	42.01	3.73
March ...	4th...30.640 "	30th...30.242 "	29.930 "	31st, 55.06	24th, 21.02	43.05	31.06	37.05	15	37.09	33.08	6.0
April ...	7th...30.608 "	27th...29.241 "	29.979 "	5th, 63.03	1st, 31.01	56.02	40.01	48.01	1	48.00	44.05	6.7
May ...	17th...30.834 "	9th...29.489 "	29.869 "	22nd, 71.08	4th, 24.00	60.00	45.01	52.05	0	53.00	49.03	1.90
June ...	13th...30.335 "	26th...29.708 "	30.263 "	29th, 74.02	16th, 43.08	66.06	48.03	57.04	0	58.02	54.06	1.81
July ...	27th...30.161 "	12th...29.493 "	29.826 "	2nd, 76.03	15th, 42.02	66.02	50.07	58.04	0	59.08	56.00	3.53
August ...	23rd...30.262 "	10th...29.618 "	29.990 "	13th, 74.05	19th, 46.00	67.03	52.08	60.00	0	61.03	57.02	2.09
September ...	13th...30.213 "	29th...29.258 "	27.788 "	17th, 70.09	9th, 41.05	62.01	51.07	56.09	0	56.06	54.03	6.14
October ...	8th...30.494 "	17th...29.455 "	29.998 "	13th, 58.06	22nd, 35.06	54.09	45.04	50.01	0	50.00	48.05	4.23
November ...	29th...30.275 "	25th...29.945 "	30.457 "	28th, 54.07	14th, 28.07	49.02	38.05	48.08	3	43.05	42.06	6.38
December ...	7th...30.566 "	14th...29.631 "	31.185 "	14th, 54.09	8th, 28.00	44.08	37.06	41.02	3	40.07	39.06	1.92

TABLE C.—The Temperature of the Year, accompanied with the previous Five Years.

Months.	1878.	1879.	1880.	1881.	1882.	Total.	Mean of 5 years.	1883.
January	32°·1	42°·1	183°·9	36°·7	40°·5
February	39°·6	43°·6	209°·4	41°·8	42°·2
March	40°·7	46°·3	224°·2	46°·0	37°·5
April	47°·7	48°·7	239°·1	47°·8	48°·1
May	55°·0	52°·5	270°·4	54°·0	52°·5
June	57°·4	56°·2	291°·2	58°·2	57°·4
July	62°·1	60°·1	311°·8	62°·3	58°·4
August	58°·7	60°·2	242°·2	60°·5	69°·0
September	56°·0	54°·3	283°·8	56°·7	56°·9
October	47°·3	50°·3	244°·3	48°·8	50°·1
November	49°·7	44°·1	219°·2	43°·8	43°·8
December...	41°·1	40°·3	201°·3	40°·2	41°·2

JANUARY.—The weather of the month of January was mild, damp, and foggy, with absence of sunshine. The winds were variable. The temperature was much above the average, being $4^{\circ}4$ above the mean of the corresponding months of the previous five years. The maximum temperature registered was $54^{\circ}2$ on the 1st; the minimum $31^{\circ}6$ on the 16th and 31st. The mean of maximum was $43^{\circ}9$; of minimum, $37^{\circ}2$. The mean of the month was $40^{\circ}5$. There were only two days when the temperature was at or below 32° . The barometer was exceedingly unsteady. Its highest reading was 30.503 in. on the 23rd; its lowest 29.179 in. on the 13th. The mean of the month was 29.853 in. The mean of hygrometric reading of dry bulb was $41^{\circ}7$, of wet bulb $40^{\circ}4$. There were 25 days on which 0.01 in. or more rain fell. The greatest fall in 24 hours was 1.11 in. on the 24th. The total rainfall measured 5.75 in.

The total deaths registered from all causes during the four weeks ending January 27th were 124, the death rate being 19.8 per 1,000 of the population. The deaths from the seven chief zymotic diseases were 23, the death rate being 3.2 per 1,000.

FEBRUARY was also mild, W. winds preponderating, but the atmosphere was less overcast. The highest temperature was $54^{\circ}7$ on the 22nd, the lowest $29^{\circ}9$ on the 1st. The mean of maximum was $49^{\circ}8$; of minimum, $38^{\circ}6$. The mean of the month was $42^{\circ}2$. There was one day when the temperature was at or below 32° . The barometer fluctuated very much during the early part of the month, but was more steady towards the latter. The highest reading was 30.770 in. on the 23rd; the lowest 28.759 in. on the 2nd. The mean for the month was 29.991 in. The mean of hygrometric dry bulb was $43^{\circ}3$, of wet bulb $42^{\circ}1$. There were 20 days on which 0.01 in. or more rain fell. The greatest fall in 24 hours was 0.65 in. on the 10th. The total rainfall was 3.73 in.

The total deaths registered during the four weeks ending February 24th were 140, the death rate being 20.1 per 1,000; the deaths from the seven chief zymotic diseases were 13, the death rate being 1.8 per 1,000.

MARCH was dry and cold, E. and N.E. winds prevailing to a considerable extent, but in other respects the weather was fine. The highest temperature registered was $55^{\circ}6$ on the 31st, the lowest $21^{\circ}2$ on the 24th. The mean of maximum was $43^{\circ}5$; of minimum, $31^{\circ}6$. The mean of the month was $37^{\circ}5$. The temperature was at or below $32^{\circ}0$ on 15 days. The barometer was high during the first week, but unsteady during the remainder of the month; its highest

point was 30·640 in. on the 4th, its lowest point was 29·242 in. on the 30th. The mean of the month was 29·930 in. The mean of hygrometric dry bulb was 37°·9, of wet bulb, 35°·8. There were 10 days on which 0·01 in. or more rain fell. The greatest fall in 24 hours was 0·12 in. on the 19th and 21st. The total rainfall was 1·60 in.

The total deaths during the five weeks ending March 31st were 205, the death rate being 23·5 per 1,000. The deaths from the seven chief zymotic diseases were 22, the death rate being 2·5 per 1,000.

The mean of temperature for the quarter at Cardiff, as compared with Greenwich, is as under:—

MONTH.	CARDIFF.	GREENWICH.	ABOVE.	BELOW.
January	40°·5	41°·2	...	0°·7.
February	44°·2	42°·6	1°·6	...
March	37°·5	36°·1	1°·4	...
Mean of Quarter	40°·7	39°·9	3°·0	...

APRIL was mild and dry, although E. winds were in excess. The maximum temperature was 63°·3 on the 5th; the minimum, 31°·9 on the 1st. The mean of maximum was 56°·2; of minimum 40°·1; the mean of the month was 48°·1. There was one day when the temperature was at or below 32°·0. The barometer was fairly high throughout the month; its highest reading was 30·608 in. on the 7th, its lowest, 29·241 in. on the 27th. The mean of the month was 29·972 in. The mean of hygrometric dry bulb was 48°·0, of wet bulb, 44°·5. There were 7 days on which 0·01 in. or more rain fell. The greatest fall in 24 hours was 0·28 in. on the 26th. The total rainfall was 0·67 in.

The deaths from all causes during the four weeks ending April 28th were 161, the death rate being 23·1 per 1,000. The deaths from the seven zymotic diseases were 9, the death rate being 1·2 per 1,000.

MAY was mild, but N.E. winds prevailed until the 12th, then W. winds set in, continuing until the end of the month. The temperature was highest on the 22nd, when the thermometer registered 71°·8, and lowest on the 4th, when it registered 34°·0.

The mean of maximum $60^{\circ}0$; of minimum, $45^{\circ}1$. The mean of the month was $52^{\circ}5$. The barometer was steady; it was highest on the 17th, when its reading was 30.334 in., its lowest on the 9th, when it was 29.489 in. The mean of the month was 29.869 in. The mean of hygrometric dry bulb was $53^{\circ}0$, of wet bulb, $49^{\circ}3$. The days on which 0.01 in. or more rain fell were 12. The greatest fall in 24 hours was 0.70 in. on the 11th. The total rainfall was 1.90 in.

The total deaths registered during the four weeks ending May 26th were 143, the death rate being 20.4 per 1,000. The deaths from the seven chief zymotic diseases were 18, the rate being 2.5 per 1,000.

JUNE was, on the whole, fine and dry the early part of the month, but wet towards the end. The prevailing winds were W., except for 3 days in the first week, when they were E. The maximum temperature was $66^{\circ}6$ on the 29th; the minimum, $48^{\circ}3$ on the 16th. The mean of the month was $57^{\circ}4$. The barometer was steady and high, being 30.335 in. on the 13th, its lowest reading was 29.706 in. on the 26th. The mean of the month, 30.263 in. The mean of hygrometric dry bulb was $53^{\circ}2$, wet bulb, $54^{\circ}6$. There were 17 days on which 0.01 in. or more rain fell. The greatest fall in 24 hours measured 1.16 in. on the 27th. The total rainfall was 3.04 in.

The total deaths registered during the five weeks ending June 30th were 152, the death rate being 17.3 per 1,000. The deaths from the seven chief zymotic diseases were 15, the death rate being 1.7 per 1,000.

The following is the temperature of the quarter in Cardiff as compared with that of Greenwich:—

MONTH.	CARDIFF.	GREENWICH.	ABOVE.	BELOW.
April	$48^{\circ}0$	$46^{\circ}8$	1.2	...
May	$52^{\circ}5$	$53^{\circ}1$	...	$0^{\circ}6$
June.....	$57^{\circ}4$	$59^{\circ}0$	...	$1^{\circ}6$
Mean of Quarter	$52^{\circ}9$	$53^{\circ}0$	...	$0^{\circ}1$

JULY was cold and wet, being 4° below the mean of the previous five years. The winds were strong, N.W. and W. winds preponderating. The maximum temperature was 76°·3 on the 2nd; the minimum 44°·2 on the 15th; the mean of maximum was 66°·2; mean of minimum 50°·7; the mean of the month being 58°·4. The barometer fluctuated very much; its highest reading was 30·16in. on the 27th; its lowest 29·493in. on the 12th; the mean of the month 29·826in. The mean of hygrometric dry bulb readings was 59°·8; of wet bulb 56°·0. 0·01in. or more rain fell on 21 days; the greatest fall in 24 hours measured 0·82in. on the 20th. The total rainfall measured 3·56in.

The total deaths registered during the month was 101; the death rate being 14·3 per 1,000. The deaths from the seven chief zymotic diseases were 12; the rate being 1·6 per 1,000.

AUGUST. The weather was wet until the 12th, and dry during the remainder of the month, W. winds again preponderating. The maximum of temperature was 74°·5 on the 13th; the minimum 46°·0 on the 19th; the mean of maximum 67°·3; the mean of minimum 52°·8; the mean of the month being 60°·0. The mean of hygrometric dry bulb reading was 61°·3; of wet bulb 57°·2. There were 16 days on which 0·01in. or more rain fell; the greatest fall in 24 hours was 0·73in. The total rainfall for the month was 2·09in.

The total deaths registered during the four weeks ending August 25th were 111; the death rate being 15·7 per 1,000. The deaths from the seven chief zymotic diseases were 26; the death rate being 3·6 per 1000.

SEPTEMBER was very wet, dull, and cloudy; W. winds still continuing more or less throughout the whole of the month. The temperature was highest on the 17th, when the thermometer registered 70°·9; and the lowest 41°·5 on the 9th; the mean of maximum was 62°·1; the mean of minimum 51°·7; the mean of month was 56°·9. The barometer was low, and oscillated very much; its highest reading was 30·213in. on the 13th; its lowest 29·258in. on the 29th; the mean for the month being 29·880in. The mean of hygrometric dry bulb reading was 56°·6; of wet bulb 54°·3. There were 19 days on which 0·01in. or more rain fell; the greatest fall in 24 hours was 1·53in. on the 23rd. The total rainfall for the month was 6·14in.

The total deaths registered during the five weeks ending September 29th were 173; the death rate being 19·6 per 1,000. The deaths from the seven chief zymotic diseases were 42; the death rate being 4·5 per 1,000.

The following is the temperature of the quarter in Cardiff as compared with that of Greenwich :—

MONTH.	CARDIFF.	GREENWICH.	ABOVE.	BELOW.
July	58°·4	59°·9	...	1°·5
August	60°·0	61°·9	...	1°·9
September ...	56°·9	56°·8	0°·1	...
Mean of Quarter	58°·4	59°·5	...	1°·1

OCTOBER was dull and wet during the first week, the degree of humidity approaching almost to complete saturation. The winds were variable throughout the whole of the month. The temperature was somewhat above the average; the highest was 58°·6 on the 13th; the lowest 35°·6 on the 22nd; the mean of maximum was 54°·9; the mean of minimum 45°·4; the mean of month 50°·1. The barometer was steady; its highest reading was 30·494in. on the 8th; its lowest 29·455in. on the 17th; the mean of month 29·998in. The mean of hygrometric dry bulb readings was 50°·0; of wet bulb 48°·5. 0·01in. or more rain fell on 17 days; the greatest fall in 24 hours was 0·61in. on the 15th; the total rainfall of the month was 4·23in.

The total deaths registered during the four weeks ending October 27th were 143; the death rate being 20·2 per 1,000. The deaths from the seven chief zymotic diseases were 37; the death rate being 4·7 per 1,000.

NOVEMBER was very wet and cold, the excessive humidity of atmosphere still continuing. The winds were very strong throughout the whole of the month, and were chiefly W. The temperature was highest on the 28th, when the thermometer registered 54°·7, the lowest on the 14th, when it registered 28°·7. The mean of maximum was 49°·2; of minimum, 38°·5. The mean of the month was 43°·8. There were 3 days on which the temperature was at or below 32°. The barometer was unsteady; its highest reading was 30·275 in. on the 29th, its lowest, 28·945 in. on the 25th. The mean of the month was 30·457 in. The mean of hygrometric dry bulb was 43°·5, of wet bulb, 42°·6. There were 24 days on which 0·01 in. or more rain fell. The greatest fall in 24 hours was on the 21st, when it measured 0·80 in. The total rainfall being 6·38 in.

The total deaths registered during the four weeks ending November 24th were 165, the death rate being 23·4 per 1,000. The deaths from the seven chief zymotic diseases were 18, the death rate being 2·5 per 1,000.

DECEMBER was still damp, the humidity being again excessive. The winds were cold, chiefly N. and W., except towards the end, when they were E. The maximum temperature was 54°·9 on the 14th; the minimum, 28°·0 on the 8th. The mean of maximum was 44°·8; of minimum, 37°·6. The mean of the month was 41°·2. There were 3 days on which the temperature was below 30°·0. The highest reading of the barometer was 30·566 in. on the 7th, the lowest, 29·631 in. on the 14th. The mean of the month was 30·185 in. The mean of hygrometric dry bulb was 40°·7, of wet bulb, 39°·6. There were 17 days on which 0·01 in. or more rain fell. The greatest fall in 24 hours measured 0·57 in. on the 10th. The total rainfall of month, 1·92 in.

The total deaths registered during the five weeks ending December 29th were 130, the death rate being 23·3 per 1,000. The deaths from the seven chief zymotic diseases were 22, the death rate being 2·5 per 1,000.

The following is the temperature of the quarter in Cardiff as compared with that of Greenwich:—

MONTH.	CARDIFF.	GREENWICH.	ABOVE.	BELOW.
October	50°·1	50°·4	...	0°·3
November ...	43°·8	43°·8	...	...
December ...	41°·2	40°·5	0°·7	...
Mean of Quarter	45°·0	44°·9	0°·1	...

TABLE D.—Illustrates the daily Direction of Winds throughout the Year.

Direction of Wind.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
N.W. ...	4	7	1	2	8	3	8	10	6	3	10	10	72
N. ...	1	...	8	2	2	1	4	1	3	6	1	3	32
N.E. ...	5	...	6	1	5	1	2	1	3	2	2	3	31
E. ...	4	1	8	12	3	4	...	...	3	6	5	5	51
S.E. ...	3	...	1	3	2	1	1	3	...	1	...	1	16
S. ...	3	8	2	2	3	5	3	4	2	1	...	1	34
S.W. ...	5	4	...	2	3	10	8	2	2	1	2	...	39
W. ...	6	8	5	6	5	5	5	10	11	11	10	8	90

THE WATER SUPPLY.

The insufficiency of the water supply has, for some time, engaged my serious attention; in that I have reason to believe, as a result of my inquiries, that it has operated unfavourably on the public health, and that it has caused a disproportionate amount of zymotic diseases in certain parts of this district. Active measures are now being taken to obtain an additional source of water supply, and, in making a selection, there are two important considerations to be borne in mind. These are—the yield of water necessary to be obtained, and its quality. As regards the first consideration, it is essential to determine the present insufficiency, and the probable increasing demand.

The greatest authorities on the subject of water supply, amongst whom I may quote Dr. PARKES, consider 25 gallons per head of a population as the minimum amount necessary for an ordinary town, namely—9 gallons for domestic purposes, and 16 gallons for municipal and trade purposes. The latter estimate I consider inadequate for Cardiff for special reasons. In my report for 1882 I detailed, at some length, your system of drainage. I then pointed out that, in consequence of the natural configuration of the district, your sewers were necessarily laid with slight gradients. These remarks especially apply to the lateral sewers. The town was originally built in the direction of inclination, namely, from north to south, and the main trunks follow this course; latterly, however, the increase has been anticlinal, namely, from east to west. On the eastern side of the town, namely, Roath, the new population probably exceeds 26,000, and on the west lies Canton with 15,000. In these two districts the sewers are lateral, and the remark as to the nature of the gradients especially applies. The water for flushing purposes enters the sewers at the northern extremity, passes through the main trunks, and, as a consequence, cannot cleanse the lateral sewers. In these, from the nature of their construction, large deposits of excretal matter must constantly take place. Practically, the flushing of these sewers is effected entirely by storm water. To rely on this at all times is very undesirable, especially so during the dry hot months of summer, when flushing is most needed. During the summer quarters of 1882 and 1883, I found the escape of sewer gases from the ventilating shafts, in the centres of the streets, exceedingly offensive, and at these times abdominal diseases (diarrhoea and typhoid fever) were especially prevalent. Even when storm water returned, these diseases for a short time increased, owing to displacement of the excretal deposits. These circumstances point to the fact that, in a district constituted as Cardiff is, 16 gallons for municipal

purposes is quite inadequate. I would urge that 30 gallons, which is the average amount of a town supply, should be taken as a minimum.

In another part of this Report I estimate the actual population of the town as exceeding 100,000. To this is to be added another 10,000, representing the probable population of the outlying districts of Penarth, Llandough, and Leckwith, with Llandaff as a further contemplated addition. The total supply daily sent into the district does not exceed 1,750,000 gallons, namely, 1,000,000 gallons from the Llanishen reservoir, and 750,000 gallons from the filtering beds at Ely, or about 15 gallons per head, so that, at the present time, the amount of your insufficiency may be considered to be absolutely another 1,750,000. The rate of yearly increasing demand would be (assuming the basis on which I estimate the population to be correct), that there is an additional 5,000 inhabitants to be supplied. This requires another 150,000 gallons daily to be supplied, or 1,500,000 gallons daily every ten years.

For the purpose of ascertaining the quality of the water at present supplied, as also that of the several sources from which water could be obtained, and their general adaptability, I requested Mr. THOMAS, your Borough Analyst, to furnish me with an analysis of these waters, as also a standard of purity for comparison; the results are given in my Annual Report for 1881, and will be found in the annexed table.

TABLE E.—Results of Analyses of Samples of Water, expressed in parts per 100,000,

BY J. W. THOMAS, F.C.S.

DESCRIPTION.	Total Solid Matter.	Albuminoid Ammonia.	Free Ammonia.	Nitrogen as Nitrates and Nitrates.	Total Nitrogen found.	Previous Sewage or Animal Contamination.	Chlorine.	Hardness.			REMARKS.
								Temporary.	Permanent.	Total.	
Water from Llanishen Reservoir (filtered)	22·8	·0085	·0028	·047	·056	—	1·15	9·0	9·4	18·4	slight peaty colour, clear
Water from Ely Pumping Works...	31·2	·006	—	·059	·064	slight	1·50	15·0	11·1	26·1	clear
Water from Aber Brook	6·3	·0070	·002	·023	·030	—	·95	·3	3·5	3·8	faint yellow colour, nearly clear
Water from Taff Fawr Stream ...	6·4	·0055	·003	—	·008	—	·75	·1	4·3	4·4	faint yellow colour, nearly clear
Water from Rudyr Brook	22·2	·006	·005	·059	·068	—	·95	6·4	11·3	17·7	practically colourless
Water from Whitechurch Brook ...	25·6	·008	·004	·024	·034	—	1·15	8·1	13·2	21·3	practically colourless
Standard of Purity	20·	·004	·002	·050	—	NIL.	1·5	14·	3·0	17·	clear

The waters obtained from your two present sources (the filter beds of reservoir at Llanishen, and the pumping station at Ely) are sufficiently pure for drinking. They, however, differ relatively in the amount of solid constituents; that obtained from Llanishen contains 22·8 per 100,000 parts; these are chiefly mineral, as the water is derived from the mountain limestone districts, and are lime products. The water, therefore, is somewhat hard, having 9 degrees of temporary, and 9·4 degrees of permanent hardness, making a total of 18·4 degrees. Although this amount is not excessive, it is not an economical water when used for domestic purposes, such as washing. A moderate quantity of lime, however, makes it more palatable. If the lime is in excess when consumed by individuals having special diatheses, it may pre-dispose to the diseases Calculus and Bronchocele, and, as a matter of fact, these diseases are somewhat prevalent in this county. The water obtained from Ely is objectionable. Its solid constituents are as high as 31·2 per 100,000 parts. Its hardness corresponds, the temporary being 15·0 degrees, and its permanent 11·1 degrees, or a total of 26·1 degrees, and is therefore 8 degrees harder than that from Llanishen. According to Dr. FRANKLAND, each degree of hardness indicates the destruction or waste of 12 lbs. of the best hard soap by 100,000 lbs. of water. In order, therefore, to get rid of 8 degrees of hardness (or its equivalent 8lbs. of carbonate of lime dissolved in the water), it would take 96lbs. of soap to 100,000 lbs. of water, or 9·6 to 1,000 gallons of water. If we take, as an average, that 6 gallons per head of population are used for general washing and ablution purposes every day, it would require 23·6 lbs. of soap per head of population per annum to reduce the hardness of the Ely water down to that of the Llanishen. It is right, however, to add that carbonate of soda is employed to get rid of the hardness of water in the operation of washing clothes; but this compound costs something, and its use is undesirable on account of its injurious effects upon cotton and linen goods, and also upon many dyes, which are partly removed or destroyed by it. Many stains are rendered insoluble by hard water, and if the latter is coloured it is extremely difficult to prevent the coloured matter becoming mordant, as it were, and fixed in the fibre of the washed material. The evidence given before the Chemical Commission of 1857 fully dealt with the question of the hardness of water, both as regards its use for domestic and drinking purposes; and it was the unanimous opinion of the numerous scientific witnesses examined, that its effects were alike injurious to health and domestic economy. The supply from the Ely source should, therefore, be only temporarily used, and until a more suitable scheme can be adopted.

The waters from the Rudry and Whitechurch Brooks differ but little from the Llanishen supply, but their capabilities are too limited to enter into your consideration.

The two other sources are the Aber and the Taff Fawr streams; both are equally pure, and differ but slightly in hardness, that of the Aber having 3·5 degrees, and the Taff Fawr 4·3 degrees, their total solid constituents 6·3 and 6·4 parts per 100,000. They therefore present for your consideration the available quantity to be obtained from either: the Aber will yield from 3 to 3½ millions of gallons daily; the Taff Fawr is practically inexhaustible. I have shewn that the extent of insufficiency is equal to 1,500,000 gallons daily; that your population to be supplied increases 5,000 annually; that the additional supply required to meet this increase is 1,500,000 gallons. At the end of ten years you will have exhausted this means of additional supply. You will be then obliged to seek another source. There are still other objections to the Aber scheme. Its watershed is from the coal measures, and when these are worked the water will necessarily be required in connection with the local works. Now the Taff Fawr flows from the range of mountains known as the Brecon Beacons, in the old red sandstone formation. It is outside the coal fields and can never be affected by manurial contamination. It will therefore be wise and economical to adopt this scheme in preference. Should this be determined upon, by bringing down its waters to your reservoirs at Llanishen, for admixture with that supply, you will have a water with only 11 degrees of hardness, this being the mean of the 4 degrees of the Taff Fawr and the 18 degrees of the Llanishen. It would be more palatable than softer water for drinking purposes, and not unduly hard for general use.

THE FOOD SUPPLY.

In recent reports to your Board, I have from time to time alluded to the circumstance that there are certain diseases of animals communicable to man, when the flesh of animals suffering from these diseases has been used as an article of food. Two of these diseases have been prevalent in this County during the year, namely, Foot and Mouth Disease and Swine Fever; but from the precautions adopted by the Contagious Diseases (Animals) Act Committees, their effects have been limited. In 1875 there was an outburst of the Foot and Mouth Disease in this locality; at this time my attention was called to a peculiar throat affection amongst children in the neighbourhood of Llanishen, where Foot and Mouth Disease extensively prevailed. It was not so fatal as diphtheria, it had no albuminoid exudation, there

was considerable inflammation of uvula, tonsils, and palate, with vesicular blebs, and in two or three instances I found pemphiginoea bullæ about the finger nails; in all cases the children had been fed with milk obtained from dairies where the cows were suffering from the disease. In conjunction with Mr. Thomas, your Public Analyst, we obtained samples of milk from these cows and submitted them to a careful examination. As the disease now recurs at frequent intervals throughout the kingdom, it may be desirable to repeat the results of these observations, in order to shew the dangers to be apprehended from feeding children on the milk of diseased cows. In the acute stages of Foot and Mouth Disease, when the udder is affected, the secretion becomes less in quantity and peculiarly rich in solid matter, and the constituent compounds are generally present in abnormal proportion. When chemical evidence could not throw much light upon the character of the milk, the microscope invariably disclosed some peculiarity foreign to healthy milk, and in most instances the appearances thus afforded were so uniform and conclusive as to leave no room for doubt that the milk was drawn from a diseased cow. As an illustration of the difference observed in the chemical composition in the milk of cows suffering from Foot and Mouth Disease, the following analyses (1 and 2) of diseased milk are given, and the composition of healthy milk (3) inserted for comparison:—

No.	Water.	Fat.	Casein.	Lactin.	Ash.	Ttl. Solids.
1	76.40	9.91	8.01	4.69	0.99	23.60
2	81.80	7.01	5.92	4.77	0.80	18.20
3	85.94	4.01	5.01	4.31	0.74	14.06

The following are characteristic microscopical appearances:—During the earlier stages of Foot and Mouth Disease, before the mammary glands appear to sympathise or become observably affected, neither the chemical nor microscopic evidences are strongly marked. There is, however, one peculiar character noticeable, viz., the affinity of the fat globules to aggregate in masses, leaving a portion of the microscopical field uncovered. In healthy milk the fat globules are equally distributed throughout the field of the microscope, and they are generally symmetrical in form, and the caseous envelopes present no peculiarities. The microscopical appearance of the milk from a

cow suffering from eczema epizootica in the first stages shews this aggregation of the fat globules, and also reveals an abnormal condition of the caseous envelope, which is seldom spherical, and which, from its fluorescent appearance, seems to indicate that the casein exists in a somewhat modified form. As the disease advances, and the mammary glands are affected, the microscope shews that the milk contains numerous foreign ingredients and altered constituents. The colour heightens, colouring matter resembling dilute hæmatin is present, and not unfrequently blood can be detected by the guracum peroxide of hydrogen test. Pus cells, characteristic epithelium scales, animal membrane, and numerous animal matters like dried blood, &c., possibly from sores on the teats, are present. At this stage the caseous envelopes of the fat globules appear very thin and glassy, mucous like, and intensely refractive. The caseous envelopes are irregular in form and deficient in tenacity, so that a portion of the butter fat is liberated and several particles aggregate and yield a streak of refractive matter, which may frequently be mistaken for foreign bodies under the microscope. In the acute stage of the disease the milk is usually acid when fresh drawn, and although the casein is not readily coagulated the globules of butter fat collect in small masses, and when a drop is let fall on a slip of glass stellate crystals of fat are seen. If a sample of milk so affected is shaken for a few minutes a considerable lump of butter fat may be caused to separate and collect. The stellate crystals of fat, of less size as the disease terminates, and the disposition of the fat globules to aggregate ceases when the disease is entirely removed from the system. Bacteria make their appearance in this milk in a very short time, but it is somewhat uncertain if they are ever present in the milk when it is in the udder unless the latter is very seriously affected.

During the year 23 pigs when slaughtered were found to be suffering from Swine Fever. These were among herds that had been imported at intervals from Ireland and conveyed to the public slaughter-houses. As no attempt had been made to expose them for sale, the owners being ignorant the animals were suffering from disease until attention was called to the fact by your Inspector, the carcasses were ordered to be destroyed, but no further action was considered necessary.

Eighteen geese were seized as being unfit for food. These were ordered to be destroyed, and, as they were exposed for sale in this state, further proceedings were taken against the owner, and a penalty of Five Pounds with costs inflicted.

The Slaughter Houses and Meat Market are constantly visited by your Sanitary Inspector.

THE DWELLINGS OF THE LABOURING CLASSES.

These are under the observation of your Inspectors, who make daily reports to me on their condition. They have been in a satisfactory state throughout the whole of the year, fairly clean and ventilated; overcrowding has not obtained to any great extent, and whenever such does occur, notices are served on the occupiers to reduce the number of inmates, which are always complied with, so that legal proceedings to enforce them have not been found necessary; to facilitate limewashing, brushes are furnished on loan from your stores to those requiring them.

THE DRAINAGE.

In my report for 1882 I described your system of drainage. I pointed out that, owing to natural difficulties, your sewers were necessarily laid at very low gradients. This, in the absence of efficient means for flushing, retards the transit of their contents, and causes an excessive amount of gases to be generated. These, finding an exit at the ventilating shafts in the middle of the streets, cause the atmosphere in their immediate neighbourhood to be at times very offensive, and operate unfavourably on the public health. On reference to Tables F F, inserted at Page 35, the evil resulting from this state of things is clearly shown. These tables indicate the number of deaths from the seven chief zymotic diseases in every street where a death from any of those diseases has occurred. The streets are grouped together in sections according to their position. The main thoroughfare passes in a direct line from east to west, and practically divides the district into two well-defined parts, namely, north and south. In the southern portion, the difficulties of drainage exist to a greater degree than on the north; and it is on the southern side that the mortality from these diseases is by far the greater, as is clearly shown in these tables; but the contrast is the most striking in the southern part of the sub-district of Roath, where the course of the sewers is flattest.

The death rate of the southern side of Roath is 5 per 1,000 inhabitants; on the north side 4. But the difference is still greater when compared with the other sub-districts of Cardiff and Canton, where the death rates from these diseases are relatively 2.5 and 2.

To get rid of these sewer exhalations has been a great consideration to your Board, and a system of destroying these gases by combustion, by means of furnaces and fans, constructed at the heads of

some of the main sewers, has been contemplated. This expedient has been tried in other places, but has been found to be too costly, and the area of the operations of each furnace is too limited to be effective. It has occurred to me that some relief might be obtained, until you can flush your sewers, by removing the pressure of the gases in your drains through the following means. The ventilating shaft in the streets passes in a vertical direction to within three feet of the surface. It then takes an horizontal direction to the grid, through which the gas passes into the air. Now, if a flue could be constructed from this horizontal section, and carried beneath the surface to the nearest convenient building, and then passed directly upwards some short distance above its highest point, the grid being closed, the gases would pass into the atmosphere at an elevation sufficiently high to be carried away by the currents of air or exposed to its oxidising influences. In either case it would be rendered harmless, and an immense benefit to the public health would result.

I am aware that a sentimental feeling of objection would be raised to the construction of these flues in connection with private dwellings. I say sentimental, because it must surely be more undesirable to have the sewer gases escaping from an outlet directly opposite to the door of the occupier of the house, who is then absolutely breathing these, with all their surrounding evils, than to have them carried up where he could suffer no inconveniences, either in the shape of an offensive smell or the harm to be apprehended from a noxious gas. But shafts such as these could be constructed contiguous to public buildings, to which no objection could apply.

It is, however, to the defective condition of the House drainage I would especially direct your attention, as in nearly every case in which I had occasion to make an inquiry into the history of a death from a zymotic disease, I have found a defective condition of the house drains; and this state of things obtains to a greater degree in the streets comprising residential houses. I will instance a few:—

In Park Place I found two semi-detached houses were drained by one drain running to the sewer at the back lane, although the plans submitted to and approved by the Local Board showed a separate drain for each house. At the point where the drains branch off, I found that the junction had been formed by breaking a hole into the larger pipe, through which the end of the branch pipe was inserted. A similar insertion had been made at the w.c.; and I have not the slightest doubt that the escape of sewer gas at these defective junctions was the cause of the fever in these two houses.

At another house in the same locality, I found in the garden an old w.c. for some time had not been used, except as a fowlhouse. Upon examination, I ascertained that the syphon was perfectly dry, and through this w.c. a considerable quantity of sewer gas was escaping. The occupier, ignorant from whence this offensive gas proceeded, and desirous of getting rid of the smell, caused a quantity of chloride of lime to be spread over the garden ground.

At a house adjoining the last, a most deplorable state of things existed. All the rain water pipes and the scullery sink-drain were connected direct with the main-sewer. This was disjointed, and made up of broken pipes, bricks and pieces of slate, at all the junctions, while the rainwater pipes—one of which was close to a low roof only 7 feet above the ground—were discharging volumes of sewer gas in several places below the windows of the first floor bedroom.

In another house in the same locality, I found a ventilating pipe from the drain of the w.c. discharging its foul air immediately below a bedroom window, while a rainwater pipe from the shut round the bay window was also discharging sewer gas immediately below another window. The scullery sink and rainwater pipes were also all connected direct with the drains, and the joints of the rainwater pipes were not properly cemented.

In Llandaff Road I found the lead pipe from the scullery sink connected directly with the drains and not trapped. The tenants of the house informed me that the connection with the drains had been made a few weeks before, and without the knowledge of the Sanitary Authority. So bad had the smell been at times from this sink, that they were obliged to stop the pipe with a cork.

At a house in Tyndall Street the drain was disjointed at the w.c. syphon, which discharged into a small square pit, formed by bricks, &c., beneath the closet seat; this pit was not covered, but was hid from sight by the wooden framing of the seat. The owner of this house was served with a notice to remedy this evil, and was at the same time requested to intimate to your inspector when this work was done, in order that it could be inspected before being covered up. Not receiving any intimation of the completion of the work, the inspector went to the place and found the part covered up, and was informed that the work had been properly completed. Shortly afterwards the drain became choked at this place, and upon opening it out, it was found that the defect had not been previously remedied, but simply covered up by a piece of flagging. The owner was now

compelled to carry out the work in a satisfactory manner, but shortly after another case of fever broke out in the house, and further examination was made of the sanitary arrangements. Upon throwing some essential oil of peppermint down the w.c., it was found that the smell of the peppermint found its way through the floor of the basement, and upon laying bare the drain at this place, I found that the drain-pipes had never been properly cemented at their joints, but were all open and dry. Although the defect of the w.c. was a serious evil, I attribute the several cases of fever in this house to the defective construction of the drain passing under the basement floor. The cases will necessarily be alluded to when detailing the history and excitant causes of fever.

I have hitherto alluded to certain collateral influences which may operate on the public health, and which, conjoined with others, may intensify their action, and conduce to fatal results.

I now propose to submit for your consideration the mortality obtaining in this district during the past year, its extent, and a classification of the certified cause of death in each case, and, when this could be obtained by a personal inquiry, the probable excitant.

The death rate has usually been taken to indicate the sanitary condition of a district, and when this is in excess it is due to diseases amenable to preventible treatment. This may be accepted, subject to certain considerations which may modify this conclusion. I may illustrate this: on more than one occasion public attention has been directed to the fact that the weekly returns of mortality issued by the Registrar-General have shewn a high death rate, but this must not be taken to mean that on such occasions it has been due to the insanitary state of Cardiff, but to the fact that these returns shew the number of deaths registered in each week, and not those which have actually taken place; a close registration of one week, together with a laxity of the next, would make a high death rate in the former a low one in the latter; the mean of the two would be the ordinary death rate. This is shewn in Table F, by observing the rates for the weeks ending December 1st and December 8th. I have previously shewn that a high death rate from all causes ruled the winter quarter, due to atmospheric influences, but a minimum rate from the seven chief zymotic diseases is also illustrated in the same table.

THE POPULATION.

In arriving at the death rate it is necessary to fix the estimated population as accurately as possible. In my estimate I have adopted the formula used by the Registrar-General, in order that my returns should approximate with that authority, and is as follows :—

The last census is taken as the basis, and for the subsequent period the annual increment ruling the previous ten years. The census return of April, 1881, gave the population of Cardiff as 85,378; the total increase between the census of 1871 and 1881 was 25,884, or a yearly increase of 2,588. The estimated population in the year would be 91,201, and this is taken as the estimated population for my annual statistical return, but at the end of the year the population would be 92,495. I have, however, every reason to believe that this estimate is far under the real population. As I have stated, the annual increase of the Kingdom is due to its natural productive powers, but there are certain towns where the increase is not simply due to this, but in addition to the constant immigration of strangers attracted by the rapid development of the local commerce. This applies to Cardiff in a marked degree; there are also other causes operating, namely, within the last 18 months constructing of large Dock and Railway extension works have given employment to special classes of workmen who have settled here with their families. This view is confirmed by a careful census of the houses taken just now completed by your Sanitary Inspectors, acting under my instructions. This return is as follows :—

TOTAL NUMBER OF HOUSES.

Sub-District.	Inhabited.	Vacant.	Building.
Cardiff ...	8,284	43	126
Roath ...	4,113	44	97
Canton ...	3,590	43	158
Total ..	15,987	130	381

The rapid yearly increase of houses is shown by the yearly return of plans passed by your Board during the years 1881, 1882, and 1883.

Years	No.
1881 ...	904
1882 ...	686
1883 ...	980

In 1851, 1861, and 1871 the proportionate number of occupants of each house varied from 6.25 to 6.75. If we take the lowest figure, namely, 6.25, the result would show a total population of not less than 99,918, or in round numbers 100,000. I am fortified in the opinion that this is the proper estimate by the annual birth rate, which will be again alluded to when speaking of the births returns.

I am aware that the average number of inmates to each house in a town population is 5.50, but Cardiff exceptionally differs from other towns in this respect. The houses are built on lease tenure, and the demand for building purposes is extraordinarily great, resulting in excessively high ground rent; hence for the houses occupied by the working-class, such as mechanics and artisans, the rent varies from seven shillings and sixpence per week to eleven shillings; each house is necessarily occupied by two or more families; this circumstance obtains to a still greater degree in the houses occupied by the lower class of workmen, notably as in the Newtown District, where the Irish labourers reside. Here, on admeasurement of the houses for the purpose of certifying as to the number of inmates to be permitted according to its accommodation—I require 400 feet cubic space for each occupant as the minimum—thus the houses are sufficiently large to afford accommodation varying from eight up to twenty inmates.

THE MARRIAGES.

The marriages during the year 1883 were as follows:—

Church of England	...	...	...	295
Chapels	...	...	...	309
Synagogue	...	...	...	1
Registrar's Office	...	...	...	445
Total	...	...	...	<u>1,050</u>

THE BIRTHS.

The births registered during the year were 3,526; shewing an excess of 127 over the previous year. The birth rate of the district has been 38.6 per 1,000 inhabitants, that of the Kingdom being only 33.2. It must, however, be borne in mind that the birth rate of Cardiff is calculated on an estimated total population, which includes 7,000 seamen, the average number constantly in the Port, whose families reside elsewhere, and who do not contribute to the birth rate. If we

deduct these 7,000 from the population proper of the district the birth rate would be 41·8. Now taking the average of the Kingdom 33·2 births represent a 1,000 population; if we take 33·2 births in Cardiff to represent 1,000, the total population would exceed 106,000; but as a birth rate of a town population is greatly in excess of an agricultural population, we may fairly consider that by this test the population of Cardiff will exceed 100,000, corroborating the estimate of population indicated by the inhabited house return.

The births were distributed over the district as under :—

Quarter ending.	Cardiff.	Roath.	Canton.	Total.	Rate per 1,000.	Rate of Kingdom.
March	447	254	195	896	39·2	35·2
June	411	252	198	861	37·7	34·3
September ...	461	253	194	908	39·8	31·7
December ...	417	262	182	861	37·7	31·8
Total	1736	1021	769	3526	38·6	33·2

Of the 3,526 births there were 1,761 males and 1,765 females.

THE DEATHS.

The total deaths registered in the District during 1883 were 1,807, arranged in conformity with sub-divisions and seasons. These are as under :—

	Cardiff.	Roath.	Canton.	Total.
Quarter ending March... ..	278	100	90	468
" " June	287	89	80	456
" " September ...	233	94	58	385
" " December ...	265	143	90	498
	1,063	426	312	1,807

There were 1,000 males, and 807 females.

The death rate was 19·8. This, compared with the 28 typical large towns, the 134 districts, and 57 sub-districts comprising chief towns; and the remaining districts and sub-districts, comprising small towns and country parishes, may be seen by the following table :—

	QUARTERS ENDING.				Death Rate of Year.
	March.	June.	Sept.	Dec.	
Cardiff	20·5	19·9	16·2	21·8	19·8
28 large towns	23·8	21·5	19·9	21·2	21·6
134 districts and 57 sub-districts, comprising chief towns	23·2	20·8	18·3	20·7	20·8
The remaining districts and sub-districts, comprising chiefly small towns and country parishes	20·8	19·0	14·5	16·6	17·7
Death rate of the whole Kingdom	22·3	20·1	16·8	19·1	19·5

It will thus be seen that the death rate of Cardiff compares favourably with that of the 28 large towns, the chief towns, and the general average of the Kingdom, but it is 2 per 1,000 in excess of the small towns and country parishes.

The deaths at ages were :

Under the age of one year	... ..	491 ⁵
One year and under five years	... ..	290
Five years and under fifteen years	... ..	104
Fifteen years and under twenty-five years	... ..	133
Twenty-five years and under sixty years	... ..	506
Sixty and upwards	... ..	283

1,807

The proportion of deaths under the age of one year is 139 per 1,000 births. This contrasts very favourably with the Kingdom or

the 28 large towns selected by the Registrar-General in his quarterly reports, the proportionate rates being as under :—

	The Kingdom.	The Large Towns.	Cardiff.
Quarter ending March ...	141	147	134 per 1000
„ „ June	126	136	122 „ „
„ „ Sept.	142	185	133 „ „
„ „ Dec.	142	159	165 „ „
Average of Year	138	157	139

The following is a classification of the registered causes of death during the year :—

Zymotic Disease ...	...	...	...	316
Constitutional ditto ...	...	...	...	283
Local ditto ...	...	...	...	840
Developmental ...	...	...	...	250
Violent ...	...	...	...	118
				1,807

The deaths were registered and distributed over the sub-districts thus :—

	Cardiff.	Roath.	Canton.
Zymotic Disease ...	144	109	53
Constitutional ...	193	50	49
Local... ..	505	191	143
Developmental ...	133	58	61
Violent ...	78	11	8
Not classed ...	10	7	4
Total... ..	1,063	426	318

In the appendix a table will be found which gives a classification of diseases, the registered cause of death in each class, the ages at death, and the proportionate death rate in the Urban Sanitary District of Cardiff in 1883, as compared with the average death rate of the Kingdom extending over 25 years. In accordance with instructions from the Local Government Board, I have compiled two other tables. Table No. 1, deaths during the year 1883, in the Urban Sanitary District of Cardiff, classified according to diseases, ages, and localities, also showing the population of such localities

and the births therein during the year. Table No. 2, illustrating new cases of sickness of a special character during the year, classified according to localities and diseases. In the Zymotic class the Registrar-General distinguishes some which he designates "The Seven Chief Zymotic Diseases." The mortality from these diseases is in many cases produced, and in all aggravated, by defective sanitary arrangements.

The deaths from the seven chief zymotic diseases occurred in the following streets and institutions. Table G shews Zymotic deaths for 1883, and previous 6 years.

CARDIFF DISTRICT.

NORTH SIDE.

Table F F.

Names of Streets.	S. Pox.	Measles.	Scarlatina.	Diphtheria.	W. Cough.	Fever.	Diar-rhea.	Total.
Bedford Street.....	1	1
Cairns Street	1	2	...	1	...	1	5
Catherine Street	1	...	...	1
Cathedral Road	1	1
Cockburn Street	1	1	1	...	...	3
Cranbrook Street...	1	1
Crwys Road	1	...	1	...	...	2
Flora Street	2	...	...	...	1	3
Llandough Terrace	1	...	...	...	...	1
Letty Street.....	1	1	2
Minnie Street	1	...	...	1
Miskin Street	1	1
North Road	2	2
Park Place	1	...	1
Richard Street.....	1	1	1	3
Salisbury Square...	1	...	...	...	1
Salisbury Road	1	...	...	1
Thesiger Street	1	...	2	3
The Barracks	1	...	1
The Walk.....	1	...	...	1
The Union	1	...	4	5
Windsor Place	1	...	...	...	...	1
Woodville Road	1	...	1	...	...	...	2
TOTAL.....	...	2	8	3	10	4	16	43

SOUTH SIDE.

Table F F.

Names of Streets.	S. Pox.	Measles.	Scarlatina.	Diphtheria.	W. Cough.	Fever.	Diar-rhea.	Total.
Adam Street	1	...	...	...	1	2
Adelaide Street	1	...	...	1	...	2
Augusta Street.....	...	1	...	...	...	...	...	1
Alice Street	2	2
Bute Street	2	...	1	3
Buzzard Street.....	1	...	...	1
Christina Street	1	1	2

CARDIFF DISTRICT.

SOUTH SIDE (*Continued.*)

Table F F.

Names of Streets.	S. Pox.	Measles.	Scarlatina.	Diphtheria.	W. Cough.	Fever.	Diarrhoea.	Total.
Coldstream Terrace	1	...	1
Crichton Place	1	...	...	...	1
David Street	...	1	...	...	...	...	...	1
Evelyn Street	...	1	2	...	...	...	...	3
Frederica Street	1	1
Frederick Street	...	1	...	...	1	...	...	2
Garth Street	1	1
George Street	1	...	1	2
Godfrey Street	1	1
Gough Street	1	1	...	...	2
Guildford Street	1	...	...	1
Harrowby Street	1	...	...	1
Herbert Street	3	...	...	3
Hills' Terrace	1	1	1	...	3
Hospital Ship	1	...	...	...	...	6	...	7
John Street	1	1
Little Frederick St.	1	1
Loudoun Square	1	1
Mary Ann Street	1	1
Mathews Court	1	...	...	1
Moir Street	3	...	...	3
Mount Stuart Sq.	2	2
Millicent Street	1	...	1
North Loudoun Pl.	1	1
Old Sea Lock	2	...	...	...	...	2
Pellett Street	2	...	...	2
Quay Street	1	...	...	...	1
Queen Street	1	...	...	...	...	1
Sandon Place	1	...	...	1
Scott Street	2	...	...	2
Sophia Street	2	2
South Church Street	1	1
South Morgan Street	...	1	...	...	...	...	...	1
South William Street	1	...	...	...	...	1
Tyndall Street	2	...	2
Upper Station Terr.	1	...	1
West Wharf	2	...	...	...	...	2
Windsor Terrace	2	...	...	...	...	2
Wood Street	1	...	...	...	1
TOTAL	1	5	12	5	21	14	19	77

ROATH DISTRICT.

NORTH SIDE.

Table F F.

Names of Streets.	S. Fox.	Measles.	Scarlatina.	Diphtheria.	W. Cough	Fever.	Diar-rhoea.	Total.
Charles Street	2	1	...	3
Clive Place	1	...	...	1
Croft Street	1	...	...	1
Daniel Street	1	...	...	...	1	2
Elm Street	1	1	...	2	4
James Street	1	...	...	1
Lily Street	1	...	...	1
Little Tredegar St.	1	1
Milton Street	1	1
Newport Road	1	...	1
Oxford Street	1	...	...	1
Partridge Road	1	1
Robert Street	1	...	...	...	1
Shakespeare Street...	1	1	2
Southey Street.....	1	1
TOTAL.....			1	2	8	3	8	22

SOUTH SIDE.

Table F F.

Names of Streets.	S. Fox.	Measles.	Scarlatina.	Diphtheria.	W. Cough	Fever.	Diar-rhoea.	Total.
Adeline Street	1	...	1
Broadway	1	2	...	...	...	3
Constellation Street	2	...	1	3
Cecil Street	1	1	...	...	...	2
Cumria Street	1	...	1	...	...	...	2
Diamond Street	1	...	...	...	...	...	1
Eclipse Street	1	...	1	1	...	3
Emerald Street	1	3	1	1	...	1	7
Fort Street	1	...	...	...	1
Gwendoline Street..	1	...	...	1	2
Harold Street	1	...	2	...	...	3
Helen Street	1	...	...	1
Howard Street.....	...	1	...	...	...	...	...	1
Inchmarnock Street	1	1	2
The Infirmary	2	...	2

ROATH DISTRICT.

SOUTH SIDE (*Continued*).

Table F F.

Names of Streets.	S. Pox.	Measles.	Scarlatina.	Diphtheria.	W. Cough	Fever.	Diarrhoea.	Total.
Iron Street	1	1
Janet Street	1	...	1
John Street	2	...	...	2
Lead Street	1	...	1	2
Moon Street	2	...	...	...	...	2
Newport Road	1	...	1	2	4
Ordell Street	1	...	1
Orbit Street	1	...	1
Pearl Street	2	...	2	...	1	5
Railway Street	2	2
Richard Terrace	1	...	...	...	1
Ruby Street	2	...	1	1	1	5
Sanguhar Street	2	1	...	1	4
Sapphire Street	1	...	2	3
Spring Gardens	1	1
System Street	1	...	...	...	1	2
Topaz Street	2	...	2	...	...	4
Tin Street	1	...	1	2
TOTAL.....		4	16	11	18	10	18	77

CANTON DISTRICT.

NORTH SIDE.

Table F F.

Names of Streets.	S. Pox.	Measles.	Scarlatina.	Diphtheria.	W. Cough	Fever.	Diarrhoea.	Total.
Conybeare Road	1	...	...	1
Ely Road	1	1	...	...	2
Glamorgan Street...	1	...	...	...	...	1
Glynne Street	1	1
King's Road	1	1
North Morgan St...	1	1
Pontcanna	1	1	2
Romilly Road	1	1
Severn Road	1	...	...	...	1	2
TOTAL.....			2	1	2	1	6	12

CANTON DISTRICT.

SOUTH SIDE.

Table F F.

Names of Streets.	S. Pox.	Measles.	Scar- latina.	Diph- theria.	W. Cough	Fever.	Diar- rhœa.	Total.
Amherst Street	1	1	1	3
Atlas Terrace	1	...	...	1
Bedwell Street.....	2	...	...	2
Bromfield Street	1	...	...	1
Cowbridge Road	2	2
Earl Street	1	...	...	...	1
Edward Street	2	...	...	...	...	2
Gladstone Terrace...	1	...	1
Hewell Street	2	2
Holmesdale Street..	1	...	1
Knole Street	2	...	...	2
Leckwith Road.....	1	1	...	...	2
Ludlow Street	1	1
Oakley Street	1	1
St. Andrew's Cres.	1	1
Sir Edward Terrace	1	1
Wellington Street...	1	1
Wyndham Street...	1	1
TOTAL.....			2	2	8	3	11	26

TABLE G.

The following Table gives the total deaths, and death rate of the seven chief zymotic diseases for each year during the six years ending 1882, with mean of same; also deaths and death rate.

Years	1877		1878		1879		1880		1881		1882		Mean of six years.		1883	
	Deaths	Death Rate	Deaths	Death Rate	Deaths	Death Rate	Deaths	Death Rate	Deaths	Death Rate	Deaths	Death Rate	Deaths	Death Rate	Deaths	Death Rate
Estimated Population	75,663		78,251		80,839		83,427		86,015		88,603		82,133		91,204	
7 Chief Zymotic Diseases.																
Small Pox ...	3	0.039	1	0.012	...	...	1	0.011	2	0.023	1	0.011	1.3	0.016	1	0.010
Measles ...	126	1.665	3	0.038	10	0.123	67	0.803	1	0.011	32	0.361	39.83	0.500	11	0.120
Scarlatina ...	30	0.396	10	0.127	44	0.544	29	0.347	20	0.232	67	0.756	33.00	0.400	42	0.460
Diphtheria ...	1	0.013	12	0.153	9	0.111	10	0.119	12	0.139	27	0.305	11.83	0.160	22	0.241
Whooping Cough ...	40	0.528	70	0.894	20	0.247	77	0.922	58	0.673	38	0.428	50.50	0.615	68	0.745
Fever ...	36	0.475	28	0.357	21	0.259	23	0.275	21	0.244	18	0.203	24.50	0.542	35	0.383
Diarrhoea ...	19	0.251	73	0.932	33	0.408	99	1.186	50	0.581	110	1.241	64.00	0.749	74	0.811
Total ...	255	3.367	197	2.513	137	1.692	306	3.653	164	1.903	293	3.306	224.69	2.982	253	2.770

SMALL POX.—There has been one death from this disease during the year; this occurred in the Hamadryad Ship Seamen's Hospital, on the 28th April. The history of the case is as follows :—On the 23rd of April I was requested to visit a sick seaman on board the barque Groen Van Pensterer, lying in the East Dock. I then found it to be a case of confluent Small Pox, and immediately caused him to be removed to the Hamadryad Seamen's Hospital. I also learned that the patient left Rotterdam on the 15th of April. Small Pox was there very prevalent. He reached Cardiff on the night of the 16th; the following day he complained of being ill. On the 22nd, that is seven days after he had left Rotterdam, the eruption developed itself. After his removal the vessel was thoroughly disinfected. The bed-clothing and the clothes worn by the sick seaman were destroyed. The usual means were taken to prevent the spread of the infection; the vessel was isolated for some days, and kept constantly under supervision. As a matter of precaution, the whole of the crew were revaccinated, and on the 22nd of May, when the vessel left, no fresh cases had occurred.

Other cases of sickness from Small Pox came under my observation. On the 14th June a case of Small Pox was reported to me; this was in Gough Street. On visiting the house I found that the patient, P. W., aged 42, was employed at the Great Western Railway Station, in the cloak department. He probably contracted the disease in the discharge of his duty. He had been ill since the 10th, and when I saw him the eruption was rather profuse, and in a modified form. On examination I ascertained that he had been vaccinated when young; there was only one cicatrix visible on his left arm, and that very indistinct.

On the 24th his wife, aged 31, became ill, she was confined to her bed for the space of three days, there was some amount of constitutional disturbance, but very few pimples, containing a semivesicular character, could be seen. She had been vaccinated in infancy, and only two very small cicatrices were discernible. On the 23rd a son, aged 14, was taken ill, with some considerable constitutional disturbance. The eruption was sparsely scattered over the body in a very modified form; he had been vaccinated when young, but had only one cicatrix, and that very indistinct. On the 24th a little boy, aged 12 years, was also taken ill; the constitutional disturbance was very slight. He was ill only three days. Two small vesicles were observed in the face. This child had been vaccinated in infancy, and two good sized cicatrices were to be seen on his left arm. Of two other children—one, aged 8 years, was vaccinated in infancy very satisfactorily; he was afterwards re-vaccinated three times without effect; the other, aged

4 years, was vaccinated in infancy, but having only one unsatisfactory cicatrix, he was now re-vaccinated in two places, and took very well. A baby, aged 5 months, had been vaccinated two days before the father was taken ill; the vaccination was effective. All three children escaped the disease.

On the 2nd of July a case of Small Pox was reported to me in Elm Street, Roath District. On visiting this house I found the patient was a seaman, who had been wrecked at Newfoundland, and was sent on to Liverpool. Two or three days after his arrival at Liverpool he felt ill, and knowing some friends at Cardiff with whom he had occasionally resided, came here. A few hours afterwards an eruption appeared in a modified form. I caused him to be removed to the Hamadryad Hospital. Immediately after his removal the room occupied by the sick man, and his clothing, were thoroughly disinfected with sulphur fumes.

There has been no further extension of the disease, either in Gough Street or Elm Street. I, however, personally instituted an inquiry into the state of vaccination in these and adjoining streets. The arms of 1,636 children were inspected, with the following results:—1,532 had been vaccinated; 115 shewed one mark only; 389 two marks; 704 three marks; 315 with four marks; and 9 with five marks; the remaining 104, or 6·35 per cent., had not been vaccinated. I considered this a large proportion, and in the event of the disease assuming an epidemic form there would be a possibility of each unvaccinated child becoming a centre of infection. I reported this circumstance to the Vaccination Committee of the Board of Guardians, and instructions were immediately given by it to the Vaccination Officer, requiring him to make a house-to-house inspection for the purpose of ascertaining the efficiency of vaccination throughout the whole district. No other case of Small Pox has occurred within the district.

MEASLES.—The number of deaths from Measles were 11, being at the rate of 0·120 per 1,000 inhabitants; this is considerably less than the average of six years in Cardiff, which was 0·500. They were chiefly registered during the month of January, as out of the 11, 7 were registered during that month, 1 was registered in March, when the disease disappeared. No other death from this disease was again registered until September, the remaining 4 occurring between this month and the end of November. They were distributed over the district thus: 7 in Cardiff and 4 in Roath; there was 1 death in Canton, but registered in error in Cardiff District.

SCARLATINA.—There were 42 deaths from Scarlatina, and were at the rate of 0·460; this was slightly above the mean of six years, but is much under the average of the Kingdom, extending over a period of 30 years, this being 0·717. Of the total number 20 were registered in the Cardiff District; namely, 8 on the north side and 12 on the south side; 18 were registered in Roath, of these 1 was on the north side and 17 on the south side; 4 deaths were registered in Canton, 2 were on the north and 2 on the south side. The first death was registered in Canton in the month of February, then 3 deaths were registered in Cardiff. After this a death was registered in May, 1 in June at Canton, and 1 in June in Cardiff; no deaths in either district were registered in July, but the disease again broke out in Cardiff during the month of August, when 3 deaths were registered, and in September the epidemic appeared in the Roath District for the first time, and prevailed with some severity in Cardiff and Roath until the end of the year. The deaths were distributed throughout the sub-districts thus:—8 on the north side of Cardiff and 12 on the south, 1 on the north side of Roath and 17 on the south, 2 on the north side of Canton and 2 on the south.

Of all infectious diseases, Scarlatina presents the greatest difficulty in the application of Hygienic provisions. These arise from the circumstance that the infective germs of the disease retain their power of assuming activity for a long period of time, are exceedingly virulent, and frequently escape the observation of those who have the care of the sick; thus it often happens that the linen worn by the sick is simply washed and put away until again needed; now exposing the clothes to the action of hot water, as in the process of washing, is not sufficient to destroy the vitality of these organisms. Again, the woollen clothes are simply exposed to the action of out-door air. It has been unmistakably proved that when these linen and woollen articles of clothing are again taken into use, even after a period of many months, the hitherto dormant germs, under the influence of favouring circumstances, develop activity; and in light cases of the disease, the parents not deeming it necessary to call in medical aid, no precautions are taken to keep them within doors or prevent them going to school. I need hardly point out that these cases never come under the observation of your executive, although they are just as capable of communicating the infection to others as the more serious ones. It also constantly occurs on my inquiry respecting the infection, that when cases of sickness are reported to me, the healthy children of the family are frequenting school, consequently conveying in their clothing the elements of infection. Moreover, no care has been taken to put chemical re-agents into the vessels receiving the excreta of patients suffering from this disease, so as to destroy the germs.

now known to be contained in the secretions, and they are emptied into the w.c., and in this way introduce these germs into the sewers, where, finding a favourable soil, they assume activity and multiply with wonderful rapidity, and introduce the disease into dwelling-houses where the sewer gases escape. I select these instances favouring the prevalence of the disease out of many as being the most prominent. The precautions prescribed by myself on visiting infected houses are to enforce isolation, to prevent children from infected houses attending school, and by serving notices on those who have charge of children to abstain from sending them to school. I also give information to school-masters of infected houses, and of the danger of permitting their pupils from these houses continuing their studies. I order chemical germicides, as carbolic acid, &c., to be placed in the vessels receiving the excreta, and that the linen clothing should be immersed in water containing a proper quantity of these chemicals, previous to washing; the woollen garments to be conveyed to your disinfecting chambers and exposed to the action of dry air, heated to a proper temperature; and I cause the rooms occupied by the sick to be disinfected by the action of burning sulphur, in the proportion of 1lb. to every 1,000 cubic feet. I believe that any means short of these taken to destroy the infection can only eventuate in disappointment and danger, the infection can only be taken to be destroyed when the germs cease to exist as organic matter. These sanitary precautions apply with equal force to all other allied diseases, such as Small Pox, Diphtheria, &c., and it will not be necessary for me to repeat them.

DIPHTHERIA.—The deaths from Diphtheria were 22, the rate 0.241; this was in excess of the mean of the previous six years, also of that of the Kingdom. They were distributed throughout the district thus:—2 on the north side of Cardiff, and 5 on the south; 2 on the north side of Roath, and 10 on the south; 1 on the north side of Canton, and 2 on the south. Diphtheria is somewhat allied to Scarletina, and, indeed, on inquiring into the history of cases, I have occasionally found that when a death has been registered from Diphtheria, other members of the family have at the same time suffered from Scarletina. When visiting the several houses in which cases of Diphtheria have occurred and reported to me I have had little difficulty in tracing the means of communication to sewer gases. I extract from my notes typical illustrations of this fact:—On the 26th February I made an inquiry into the history of a fatal case of Diphtheria at Broadway, in Roath District. I carefully examined the whole of the house sewer arrangement; everything was most satisfactory, the child had been exposed to no source of infection as far as I could learn, but the mother informed me that

when the covering of the side-opening, or man-hole, communicating with the drains was raised (this being directly opposite the house), the escape of sewer gas was most offensive, and that this had occurred just before the child had been taken ill. I then continued my inquiry into another case close by, namely, in Fort Street. There I found that all the excreta passing from the sick child, as also the contents of the vessel receiving the copious discharges from the mouth and nose, were, without any admixture of disinfectants, thrown direct into the soil pipe communicating with the main drain, to the greatest danger of spreading the disease throughout the district; and it is to this circumstance I attribute the source of infection in the first case. On April 24th I visited a house in Salisbury Road in which a fatal case of Diphtheria had occurred. The patient was a female aged 23, who had been confined a few days previous to Diphtheriatic symptoms shewing themselves; nearly the whole of the other inmates of the house suffered from sore throat; on examining the sewer arrangements I ascertained that the joints of the soil-pipes from the w.c. were very defective and permitted an escape of sewer gas, and that the occupants of the house complained constantly of sickness and nausea, which they attributed to this cause. A fatal case of Diphtheria was reported to me in Cockburn Street. I here found a similar state of defective drainage, with other cases of sore throat among the inmates. I will now give an instance of the danger to be apprehended by not taking proper care to disinfect the clothing worn by the patient suffering from Diphtheria. I visited a house in the Canton District where a fatal case of Diphtheria had occurred. The medical man in attendance had properly directed the immediate removal of another child, then quite well, to the house of some relatives in Roath. Among other facts I elicited that the linen worn by the patient, and the handkerchiefs used in wiping the discharges from the mouth, were simply washed and put away; three weeks afterwards the child at Roath, who had been using some of the linen, was taken ill with Diphtheria and died.

As I have previously stated, sewer gas has been found in almost every case of Diphtheria I have visited, but it is not necessary in this report to repeat illustrations.

WHOOPIING COUGH.—Whooping Cough has been more or less prevalent throughout the year; 68 deaths have been registered from this disease, the death rate being 0·745; this is in excess of the average of the previous six years, as also that of the Kingdom. The epidemic was fatal in the early and later months of the year, the mortality being intensified by atmospheric influences. Whooping Cough presents great difficulty in applying sanitary precautions from

the fact that in each case the disease lasts for a very long period; during the whole of this time it is infectious and isolation impracticable.

TYPHOID FEVER.—Typhoid Fever has produced a mortality of 35; or at the rate of 0·383 per 1,000. Although this is in excess of the last four years, it is considerably under the mean of six years, and only slightly above the average of the Kingdom. Of the total deaths from fever, 6 were registered on the north side of Cardiff, and 14 on the south; 3 were registered on the north side of Roath, and 8 on the south; 1 was registered on the north side of Canton, 3 on the south. Eleven were registered up to the 30th of June, and 24 the latter six months of the year, when it may be said to have assumed a more epidemic form, and to a certain extent localised to centres of infection, the greatest mortality being during the months of September, October, November, and December. Four of the fatal cases were registered under the age of 5 years. These on inquiry, I had reason to believe, were in the remittent, or continued form, and did not present the essential characteristics of Typhoid; 17 between the age of 5 and 25; 12 between 25 and 45; and 2 above 55. Of the total deaths (20) registered in Cardiff, 6 occurred in the Hamadryad Seamen's Hospital. These were all foreign seamen conveyed from the shipping into this institution, and were sick on arrival at this port. Two other cases occurred in the Infirmary. Typhoid Fever is essentially an abdominal disease; this marks it distinct from Typhus, the former is infectious, the latter contagious. As regards Typhoid Fever it may fairly be taken that the disease is introduced into the system, either by the air we breathe, the water we drink, and probably in some instances the food we eat. As regards the air we breathe, it is due to the morbid germs thrown off by the individual in the excreta and passing into the sewers; there finding a fertile soil for development, they multiply, as I have previously stated, with great rapidity, and are conveyed with the gaseous exhalations into the atmosphere, in this way poisoning the air we breathe. They find their way into the water we drink by sewage matter passing into it direct or by infiltration, and as regards the food we eat, I have reason to believe that there are certain epizootic diseases of animals communicable to man.

The following Tables show the deaths from fever in each month throughout the year, and their distribution, the temperature, and age in each case:—

FEVER. TABLE H.

MONTH.	DEATHS.				Death Rate.	TEMPERATURE.					
	Districts.					Maximum.	Minimum.	Mean of Max.	Mean of Min.	Mean of Month.	No. of Wet Days.
	Cardiff.	Roath.	Canton.	Total.							
January	1	1	...	2	1st, 54°·2	16th, 31°·6	43°·9	37°·2	40°·5	25	
February	1	3	...	4	22nd, 54°·7	1st, 29°·9	49°·8	38°·6	42°·2	20	
March	2	...	...	2	31st, 55°·6	24th, 21°·2	43°·5	31°·6	37°·5	10
April	...	...	...	...	5th, 63°·3	1st, 31°·1	56°·2	40°·1	48°·1	7
May	1	1	...	2	22nd, 71°·8	4th, 34°·0	60°·0	45°·1	52°·5	12	
June	...	...	1	1	29th, 74°·2	16th, 43°·8	66°·6	48°·3	57°·4	17
July	2	...	...	2	2nd, 76°·3	15th, 42°·2	66°·2	50°·7	58°·4	21
August	3	...	...	3	13th, 74°·5	19th, 46°·0	67°·3	52°·8	60°·0	16
September	3	1	...	4	17th, 70°·9	9th, 41°·5	62°·1	51°·7	56°·9	19	
October	3	1	...	4	13th, 58°·6	22nd, 35°·6	54°·9	45°·4	50°·1	17	
November	2	3	1	6	28th, 54°·7	14th, 28°·7	49°·2	38°·5	43°·8	24	
December	2	1	2	5	14th, 54°·9	8th, 28°·0	44°·8	37°·6	41°·2	17	
Total	20	11	4	35	0·383						

FEVER. DEATHS AT AGE. TABLE I.

MONTH.	MONTHS.					YEARS.										Total				
	0	1	3	6	9	1	2	3	4	5	10	15	25	35	45		55	65	75	85	95
January...	1	1	...	...	...	...	...	...	...	...
February...	2	...	...	...	...	...	...	...
March...	1	1	...	...	...	...	...	...	...
April...
May...	1	...	...	...	1	...	...	...	...
June...	1	...	...	...	...	...	...	...	...
July...	1	...	...	...	...	...	...	...
August...	1	...	...	2	...	...	...	...	...	...	...	...
September...	2	...	1	...	...	...	...	...	...
October...	3	1	...	...	...	...	...	...	...
November...	1	...	...	2	3	...	...	...	...	...	...
December...	2	2	...	...	...	1	...	...	...	...
Total...	1	...	2	1	1	3	13	7	5	...	2	...	...	...	35

There have been several marked instances of the disease arising from sewer exhalations; one was in Coldstream Terrace, where a defective condition of sewers permitted the sewage matter to escape, and spread itself over the back area, causing very offensive effluvia. In the early part of March some cases of Typhoid Fever were reported to me in a house in Bromsgrove Street. On visiting this house I found there a lad, aged 3 years, suffering from Typhoid Fever, but there had been other cases in the same house just previously. The first case was that of a fireman recently on board a vessel, who, while at Havre, became poorly; he was under medical treatment for a day or two while the vessel was at Bilbao. After this he came to Cardiff, and immediately went to this, his own house. He had then confirmed Typhoid symptoms; although there was considerable diarrhoea, no means were taken to prevent infection, as by putting disinfectants into the vessels receiving the excreta. The atmosphere of the house consequently became infected, resulting in the disease extending to three other members of the same family. These four cases ultimately recovered. The latter end of March I was requested to visit one of the crew belonging to the emigrant ship "Oxford;" he was suffering from Typhoid Fever. I caused him to be immediately removed to the Hamadryad Hospital. I learned that a day or two before the ship had been driven down Channel by stress of weather, the whole of the passengers and crew were exposed to much wet and cold in consequence of the stormy weather. It appears just as the vessel was about leaving Liverpool, one of the passengers came on board suffering from diarrhoea, probably Typhoid. The weather being very bad, and the passengers suffering greatly, could not avail themselves of the ordinary accommodations, and the cleanliness of the ship could not be maintained. The day after I visited the ship all the passengers left, but two of the crew were subsequently taken ill with Typhoid, and were also removed to the Hamadryad, in which institution they did well. The ship was afterwards thoroughly disinfected with chlorine gas and sulphur fumes alternately, and the vessel put in thorough repair before leaving, and all the crew at this time being in good health.

On May 21st I inquired into the history of a fatal case of Typhoid Fever in Christina Street; in this house I found the w.c. in a most offensive condition. The same day I inquired into a case registered as Typhoid Fever in Roath; in this case I could not learn that there were any abdominal symptoms, or Typhoid spots. I then ascertained that the deceased was a coal trimmer, that on returning home one morning after being exposed all night to wet and cold, he was seized with rigors, and intense pain in the left side, confined to a

spot where he had a badly united fracture of the ribs, from injuries he had received two or three years previously, and whenever he had been exposed to cold, his symptoms localised themselves there. I am disposed to consider this case Sporadic or Traumatic. In October I received a communication from Gloucester, informing me that the Norwegian Barque "Spenier" had left Gloucester, bound for this Port, and that one of her crew had suffered from Typhoid Fever, and been removed to Gloucester Hospital; immediately on her arrival here I visited the ship. I then found that after leaving Gloucester, another seaman was taken ill, with symptoms of Fever. I caused him to be removed to the Hamadryad Hospital, and on examining the remainder of the crew I found two others suffering from the premonitory symptoms of Fever. I therefore directed these to be sent to the same institution. I afterwards inquired into the history of the disease. It would appear that on leaving Montreal the crew consisted of nine persons all told, and in good health; the following day some of them suffered from Diarrhoeal symptoms, and on their way to Gloucester one of the crew died. The man deposited at Gloucester also died, as well as two of the three sent to the Hamadryad. The cases treated at the Hamadryad had characteristic Typhoid spots, with more or less Diarrhoea. The vessel being clean, and in a satisfactory state, I inquired as to the quality of water used, and I took a sample with me, and transmitted it to your Analyst, Mr. Thomas, for examination, with the following result:—

Total solid matter	...	...	...	32.9
Albuminoid Ammonia	...	...	...	.028
Free Ammonia	...	...	...	.010
Nitrogen as Nitrates and Nitrites	...	...	...	.0
Total Nitrogen found	...	...	...	.031
Previous Sewage or Animal Contamination	...	...	...	.0
Chlorine	...	...	...	11.6
Magnesia Salts	...	...	...	rather excessive
Hardness	{ Temporary	...	...	3.1
	{ Permanent	...	...	9.1
Total				12.2

On October 27th a fatal case of Typhoid was reported to me at 20, Tyndall Street. The deceased was a lad, aged 17, a ship carpenter. On visiting the house I found the pan of the w.c. broken, and the soil pipe in a very defective state; the attention of the owner was called to the fact, and the Sanitary Inspector served him with a notice to carry out the repairs, with instructions that before these repairs were covered they were to be seen by the Surveyor, who would then certify whether they had been done to his satisfaction.

Not receiving any intimation in three or four days he visited the house, and found a new pan, but the other part had been covered and could not be examined. In the early part of December another death from Typhoid Fever was reported to me in this house. I then caused the soil-pipes to be uncovered, and found that the original defects had never been attempted to be remedied. I then caused proceedings to be taken against the owner before the Magistrates, who made a peremptory order for the instructions of the Surveyor to be carried out. The latter end of December a death from Typhoid Fever was registered in Park Place. On inquiry, I ascertained that just about the time the deceased was taken ill, a very offensive smell of sewer-gas was found to exist in the garden, and to remedy this disinfectants were thrown over the surface, but no attempt had been made to discover the source of the nuisance. On examination of the premises it was found to have proceeded from an abandoned soil-pipe. My attention at about this time being called to some other cases of Typhoid that had occurred in two semi-detached houses in the same locality, on inquiry I ascertained that 2 cases originated in one house, and these were followed by 3 cases in the adjoining house. An examination was then made, when it was ascertained that the drains belonging to each house united, and where the junction took place the connection had become defective. The joints not being properly cemented had permitted the escape of sewer-gas, which was doubtless the source of infection.

These instances, extracted from many, shew how necessary it is, when the occupier of a house experiences a disagreeable smell, as it is probably associated with an element of danger, that he should report the same to the Inspector of Nuisances, that he may ascertain its source.

DIARRHŒA —The deaths registered from Diarrhœa were 74, the death rate being 811 per 1,000. This was slightly above the mean in Cardiff during the previous six years, which was 749, but less than the average of the kingdom.

The deaths were distributed over the district thus:—15 were registered on the north side of Cardiff, and 19 on the south; 8 on the north side of Roath, and 16 on the south; 6 on the north side of Canton, and 10 on the south. Tables J and K give a monthly return of deaths registered in each sub-district, with temperature, and deaths at age.

DEATHS FROM DIARRHŒA. TABLE J.

MONTH.	DEATHS.				Death Rate.	TEMPERATURE.					
	Districts.					Maximum.	Minimum.	Mean of Max.	Mean of Min.	Mean of Month.	No. of Wet Days.
	Cardiff.	Ronth.	Canton.	Total.							
January	...	1	1	2	1st, 54°·2	16th, 31°·6	43°·9	37°·2	40°·5	25	
February	...	2	...	3	22nd, 54°·7	1st, 29°·9	49°·8	38°·6	42°·2	20	
March	...	3	...	3	31st, 55°·6	24th, 21°·2	43°·5	31°·6	37°·5	10	
April	...	1	...	1	5th, 63°·3	1st, 31°·1	56°·2	40°·1	48°·1	7	
May	22nd, 71°·8	4th, 34°·0	60°·0	45°·1	52°·5	12	
June	...	2	...	3	29th, 74°·2	16th, 43°·8	66°·6	48°·3	57°·4	17	
July	...	3	1	6	2nd, 76°·3	15th, 42°·2	66°·2	50°·7	58°·4	21	
August	...	9	4	21	13th, 74°·5	19th, 46°·0	67°·3	52°·8	60°·0	16	
September	...	7	4	17	17th, 70°·9	9th, 41°·5	62°·1	51°·7	56°·9	19	
October	...	7	3	14	13th, 58°·6	22nd, 35°·6	54°·9	45°·4	50°·1	17	
November	...	1	2	3	28th, 54°·7	14th, 28°·7	49°·2	38°·5	43°·8	24	
December	...	1	...	1	14th, 54°·9	8th, 28°·0	44°·8	37°·6	41°·2	17	
Total	34	24	16	74.	0·822						

DIARRHŒA. DEATHS AT AGE. TABLE K.

MONTH.	MONTHS.					YEARS.										Total					
	0	1	3	6	9	1	2	3	4	5	10	15	25	35	45		55	65	75	85	95
January ...	...	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2
February ..	1	...	...	...	...	...	1	...	...	...	...	...	...	1	...	...	...	...	...	...	3
March ...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3
April ...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
May ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
June ...	...	1	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
July ...	...	1	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
August ...	1	5	9	1	1	1	1	...	...	...	...	1	...	...	...	1	...	1	...	...	3
September	2	3	6	3	1	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	6
October ...	2	2	2	...	1	...	...	...	...	...	...	1	...	...	...	3	...	...	...	...	21
November	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	17
December	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	14
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Total ...	8	15	25	4	3	7	2	...	...	...	...	2	...	1	...	6	...	1	...	...	74

In my report for 1882, I entered at some length into the etiology of diarrhœa. I shewed that it might be sporadic in its character, that is, from some abnormal condition of the individual, and symptomatic of some other disease; or it might be a disease *per se*; it is then due to an epidemic influence, and appears in two forms: in one it attacks individuals at all ages, in the other it is confined to young children, and is commonly designated infantile diarrhœa. It is especially fatal during the third quarter months, July, August, and September.

In the report to which I have alluded, I described temperature and diet as two important factors in the origin or development of the disease, and my experience of the past year confirms this opinion, as Table No. 1 shews that of the total number of deaths from this disease, 55 were registered under the age of 1 year, 7 were under the age of 2, and 2 were under the age of 3 years; the remaining 10 were adults. Table J indicates that up to the end of June only 12 deaths from this disease were registered; these were scattered over the 6 months at an average of 2 per month, but in July it assumed an epidemic form, as 6 deaths were registered. This is less than the usual number recorded in that month, and the temperature was less than the mean, but in August the temperature reached the highest point of the year, and the number of deaths went up to 21. During September and October, with a falling temperature, the number of deaths began to diminish, and were relatively 17 and 14. After the latter month the disease was sporadic, maintaining the average number of two deaths per month.

These Tables, therefore, mark the epidemic as infantile, and illustrate the influence of temperature. As regards diet, I again instituted an inquiry into the history of each case coming under my observation, and I ascertained that all had been fed on Cows' Milk, with or without other artificial food. In my last report I described the changes in the condition of the milk, commencing immediately after being taken from the Cow. And that these changes were hastened and intensified during the hot weather, often rendering the milk unfit as an article of diet for infants. Moreover I constantly found that the milk was kept in improper places, as in a pantry, where the window was immediately over an ill-trapped sink passing direct to the main sewer, or closely adjacent to the w.c., thus exposed to the action of sewer gases, and I have reason to believe that milk readily absorbs infective germs contained in these gases.

CONSTITUTIONAL DISEASES.—There is little calling for observation in this class of Diseases, the improvement in Phthisis (and with it

the allied diseases, Scrofula and Tabes, mentioned in Dr. BUCHANAN'S Table) has been maintained.

LOCAL.—There is a class independent of sanitary control. The mortality is very subject to atmospheric influences, and is alluded to in my remarks on meteorology.

VIOLENT DEATHS.—There is usually found to be an excess of mortality in this class as compared with the average of the kingdom; this is due to the nature of occupation, and the accidents associated with Dock and other special classes of employment. The following details the number of inquests, with a classification of verdicts returned :—

Accidents and Violence	...	...	...	49
Homicide	...	...	...	3
Accidental Poisoning	...	...	...	3
Drowned	...	...	...	38
Natural causes	...	...	...	58
Total	...	...	...	151

The deaths at institutions were as under :—

Infirmary	...	...	...	42
Hamadryad	...	...	...	26
Gaol	...	...	...	1
Union	...	...	...	120

Subjoined is a summary of work done by your executive :—

19,804 day and 1,437 night visits were made by your Inspectors of Lodging-houses, and their condition duly reported to me every morning.

89 houses were found to be overcrowded; in each case notices were served upon the occupiers to reduce the number of inmates. These having been complied with, it has, therefore, not been necessary to take further action.

288 houses were ordered to be lime-washed and cleansed. On application, brushes were supplied from your stores, on loan, to enable the poor people to carry out this necessary work.

4 houses were condemned as being unfit for habitation until necessary repairs were executed.

121 houses were fumigated after cases of infection.

435 closets and 281 surface drains were defective, and notices were served to remedy these. In 7 instances only were proceedings

necessary to be taken to enforce repairs; in these cases magisterial orders were obtained.

59 cesspools were cleansed and disinfected, and when contiguous to the public sewers, connection was enforced.

79 bake-houses were inspected and found not to be in a satisfactory state. These were ordered to be cleansed and lime-washed.

118 cow sheds were inspected from time to time, and when necessary, lime-washing was enforced. Proceedings were taken in two instances against owners for non-compliance with printed regulations; the defendants were fined 40/- and 10/- with costs.

A large quantity of bedding and clothing were exposed to the action of heated air at your disinfecting chambers.

735 pounds of pork and 300 pounds of beef were destroyed as being unfit for food.

19 geese, exposed for sale in a semi-putrid state, were seized and ordered to be destroyed. Proceedings were taken against the owner, and a penalty of £5 and costs inflicted.

In executing the above operations, great activity has been shewn by Mr. GOVER, your chief inspector, and your two sub-inspectors, Messrs. LEYSHON and VAUGHAN.

I have the honour to be, Gentlemen,

Your obedient Servant,

H. J. PAINE, M.D.,

Medical Officer of Health, Cardiff Urban
Sanitary Authority.

APPENDIX No. 1.

CARDIFF URBAN SANITARY DISTRICT.

Deaths registered at several groups of ages from different causes during the year 1883.

CAUSES OF DEATH.		AGES.						Total.	Death Rate in Cardiff per 1000 Inhabitants, 1883.	Mean Death Rate per 1000 Inhabitants of Kingdom for 30 years.
		Under 1 year.	1 and under 5.	5 and under 15.	15 and under 25.	25 and under 60.	60 and upwards.			
CLASSES.										
I. Zymotic	...	102	120	41	18	32	3	316	3.464	4.845
II. Constitutional	...	24	30	17	51	141	20	283	3.102	4.108
III. Local	...	211	111	40	43	253	182	840	9.210	8.721
IV. Developmental	...	140	22	5	19	64		250	2.741	3.464
V. Violent	...	14	7	6	16	61	14	118	1.293	758
Totals		491	290	104	133	506	283	1807	19.812	22.105
CLASS I. ZYMOTIC.										
Smallpox	...					1		1	0.010	.221
Measles	...	1	9	1				11	0.120	.413
Scarlet Fever (Scarlatina)	...	2	26	14				42	0.046	.717
Diphtheria	...	1	13	7	1			22	0.241	.128
Croup	...	5	16	7				28	0.307	.228
Whooping Cough	...	27	38	3				68	0.745	.519
Typhoid Fever	...		4	5	14	12		35	0.383	.300
Erysipelas	...	3			1	2		6	0.065	.096
Dysentery	...				1			1	0.010	
Diarrhoea	...	54	14			5	1	74	0.811	.872
Rheumatism	...			3		2	2	7	0.076	.115
Syphilis	...	8			1	1		10	0.109	.066
Want of Breast Milk	...	1						1	0.010	.053
Alcoholism	{ Del. Tremens...					3		3	0.032	.022
	{ Intemperance...					4		4	0.043	.018
Cynanche	...					1		1	0.010	
Pyæmia	...			1		1		2	0.021	
Totals		102	120	41	18	32	3	316	3.464	4.845
CLASS II. CONSTITUTIONAL.										
Dropsy	...			1			1	1	0.010	.344
Cancer	...					22	16	38	0.416	.389
Scrofula	...	2	5	3	2	3		15	0.164	.141
Tabes Mesenterica	...	6	7	1				14	0.153	.290
Phthisis	...	2	10	7	48	115	4	186	2.039	2.491
Hydrocephalus	...	14	8	5	1	1		29	0.317	.362
Totals		24	30	17	51	141	20	283	3.102	4.108
CLASS III. LOCAL.										
Cephalitis	...	2	12	4	3	1		22	0.241	.213
Apoplexy	...			1		16	16	33	0.361	.490
Paralysis	...	1	1	1		20	18	41	0.449	.488
Epilepsy	...	1	1	2	1		6	11	0.120	.115
Convulsions	...	128	39	1		2		170	1.863	1.222
Brain Disease	...		2	2	1	11	12	28	0.307	.240
Tetanus	...			1	2	2	1	6	0.065	
Aneurism	...					2		2	0.021	.023
Heart Disease	...	2	1	9	8	53	25	98	1.074	.971
Laryngitis	...		2					2	0.021	.070
Bronchitis	...	37	22	2	1	35	51	148	1.622	1.740
Pleurisy	...		1		2	4		7	0.076	.047
Pneumonia	...	27	25	5	12	44	19	132	1.447	1.141
Asthma	...					4	3	7	0.076	.188
Lung Disease	...	1	3	2		10	1	17	0.186	.202
Gastritis	...				1	1	2	4	0.043	.038
Enteritis	...	1		1				2	0.021	.155
Peritonitis	...	1		1	5	7	1	15	0.164	.078
Ulceration of Intestine	...			1				1	0.010	.046
Hernia	...					1		1	0.010	.043
Stricture of Intestine	...	1						1	0.010	.014
Stomach Disease	...	1				1	2	4	0.043	.125
Jaundice	...	2				1	1	4	0.043	.070
Liver Disease	...	2				7	6	15	0.164	.247
Cirrhosis	...					2		2	0.021	
Spleen Disease	...					1		1	0.010	
Colic	...	1			2	1	4	8	0.087	
Nephritis	...		1	3	1	2		7	0.076	.022
Bright's Disease	...	1		3	3	17	10	34	0.372	.095
Diabetes	...				1	4	1	6	0.065	.030
Bladder Disease	...						3	3	0.032	
Kidney Disease	...		1			3		4	0.043	.114
Joint Disease	...			1				1	0.010	.075
Psoas Abscess	...					1		1	0.010	
Phlegmon	...	2						2	0.021	.025
Totals		211	111	40	43	253	182	840	9.210	8.721
CLASS IV. DEVELOPMENTAL.										
Premature Birth	...	39						39	0.427	.583
Spina Bifida	...	1						1	0.010	.018
Other Malformation	...	1						1	0.010	.021
Teething	...	7	11					18	0.197	.204
Improper Feeding	...	1						1	0.010	
Child Birth	...				5	18		23	0.252	.107
Old Age	...					1	63	64	0.701	1.330
Atrophy and Debility	...	91	11				1	103	1.129	1.172
Totals		140	22		5	19	64	250	2.741	3.464
CLASS V. VIOLENT.										
Fractures	...	1	1	1	4	13	5	25	0.274	.291
Burns and Scalds	...	1	4			3	1	9	0.098	.101
Poison	...					3		3	0.032	.008
Drowning	...	1	1	3	11	20	2	38	0.416	.127
Suffocation	...	5				1		6	0.065	.070
Injuries	...			2	1	7	1	11	0.120	
Cut Throat	...						1	1	0.010	
Suicide	...					1		1	0.010	
Murder	...	1				1		2	0.021	
Manslaughter	...	1						1	0.010	
Not Classed	...	4	1			12	4	21	0.230	
Totals		14	7	6	16	61	14	118	1.293	22.105

Table of Deaths during the year 1883, in the Urban Sanitary District of Cardiff.

CLASSIFIED ACCORDING TO DISEASES, AGES, AND LOCALITIES, AND SHOWING ALSO THE POPULATION OF SUCH LOCALITIES, AND THE BIRTHS THEREIN DURING THE YEAR.

1. Name of Locality, being Particulars of the names of the streets of the various localities, and showing also the population of each locality, and the births therein during the year.	POPULATION AT ALL AGES.		MORTALITY FROM ALL CAUSES AT REMOVED AGES.		MORTALITY FROM REMOVED CAUSES, DISTINGUISHING DEATHS OF CHILDREN UNDER FIVE YEARS OF AGE.													
	Quinquennial Census, 1881	Estimated to middle of 1883.	At all ages.	Under 15 years.	Under 5 years.	Under 1 year.	Under 5 months.	Under 1 month.	Under 5 weeks.	Under 1 week.	Under 5 days.	Under 1 day.	Under 5 hours.	Under 1 hour.	Under 5 minutes.	Under 1 minute.	Under 5 seconds.	Under 1 second.
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
20. Diseases, such as Diphtheria, Whooping Cough, Measles, Scarlet Fever, Typhoid, Typhus, Cholera, and other diseases, and the deaths therein during the year.	21. Diseases, such as Diphtheria, Whooping Cough, Measles, Scarlet Fever, Typhoid, Typhus, Cholera, and other diseases, and the deaths therein during the year.	22. Diseases, such as Diphtheria, Whooping Cough, Measles, Scarlet Fever, Typhoid, Typhus, Cholera, and other diseases, and the deaths therein during the year.	23. Diseases, such as Diphtheria, Whooping Cough, Measles, Scarlet Fever, Typhoid, Typhus, Cholera, and other diseases, and the deaths therein during the year.	24. Diseases, such as Diphtheria, Whooping Cough, Measles, Scarlet Fever, Typhoid, Typhus, Cholera, and other diseases, and the deaths therein during the year.	25. Diseases, such as Diphtheria, Whooping Cough, Measles, Scarlet Fever, Typhoid, Typhus, Cholera, and other diseases, and the deaths therein during the year.	26. Diseases, such as Diphtheria, Whooping Cough, Measles, Scarlet Fever, Typhoid, Typhus, Cholera, and other diseases, and the deaths therein during the year.	27. Diseases, such as Diphtheria, Whooping Cough, Measles, Scarlet Fever, Typhoid, Typhus, Cholera, and other diseases, and the deaths therein during the year.	28. Diseases, such as Diphtheria, Whooping Cough, Measles, Scarlet Fever, Typhoid, Typhus, Cholera, and other diseases, and the deaths therein during the year.	29. Diseases, such as Diphtheria, Whooping Cough, Measles, Scarlet Fever, Typhoid, Typhus, Cholera, and other diseases, and the deaths therein during the year.	30. Diseases, such as Diphtheria, Whooping Cough, Measles, Scarlet Fever, Typhoid, Typhus, Cholera, and other diseases, and the deaths therein during the year.	31. Diseases, such as Diphtheria, Whooping Cough, Measles, Scarlet Fever, Typhoid, Typhus, Cholera, and other diseases, and the deaths therein during the year.	32. Diseases, such as Diphtheria, Whooping Cough, Measles, Scarlet Fever, Typhoid, Typhus, Cholera, and other diseases, and the deaths therein during the year.	33. Diseases, such as Diphtheria, Whooping Cough, Measles, Scarlet Fever, Typhoid, Typhus, Cholera, and other diseases, and the deaths therein during the year.	34. Diseases, such as Diphtheria, Whooping Cough, Measles, Scarlet Fever, Typhoid, Typhus, Cholera, and other diseases, and the deaths therein during the year.	35. Diseases, such as Diphtheria, Whooping Cough, Measles, Scarlet Fever, Typhoid, Typhus, Cholera, and other diseases, and the deaths therein during the year.	36. Diseases, such as Diphtheria, Whooping Cough, Measles, Scarlet Fever, Typhoid, Typhus, Cholera, and other diseases, and the deaths therein during the year.	37. Diseases, such as Diphtheria, Whooping Cough, Measles, Scarlet Fever, Typhoid, Typhus, Cholera, and other diseases, and the deaths therein during the year.	38. Diseases, such as Diphtheria, Whooping Cough, Measles, Scarlet Fever, Typhoid, Typhus, Cholera, and other diseases, and the deaths therein during the year.

Table of New Cases of Sickness, coming to the knowledge of the Medical Officer of Health, during the year 1883, in the Urban Sanitary District of Cardiff.

CLASSIFIED ACCORDING TO LOCALITIES AND DISEASES.

NAMES OF LOCALITIES.	NEW CASES OF SICKNESS IN FAMILIES ATTENDING TO THE DISTRICT, DISTINGUISHING THESE IN CHILDREN UNDER FIVE YEARS OF AGE.														OTHER DISEASES, such as Diphtheria, Whooping Cough, Measles, Scarlet Fever, Typhoid, Typhus, Cholera, and other diseases, and the deaths therein during the year.			
	Workhouse, In.	Out.	Infirmary, In.	Out.	Hamondryd, In.	Out.	Gladstone, In.	Out.	Totals.	Workhouse, In.	Out.	Infirmary, In.	Out.	Hamondryd, In.	Out.	Gladstone, In.	Out.	Totals.
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
Workhouse, In.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.
Out.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.
Infirmary, In.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.
Out.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.
Hamondryd, In.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.
Out.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.
Gladstone, In.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.
Out.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.
Totals.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.	Under 5.

* New Admittance Classification Register kept of One-Patient of the Infirmary or Hospital (Sup.)